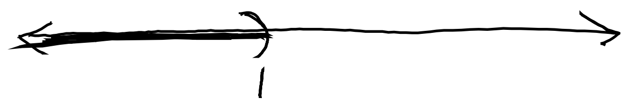
Practice Test Two 0350

(1) $3x+1<4$ **and** $2x+4\geq -4$

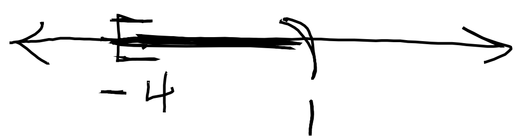
$$\begin{array}{r} 3x+1<4 \\ \underline{-1\quad -1} \\ \frac{3x}{3} < \frac{3}{3} \end{array}$$

$x<1$



$$\begin{array}{r} 2x+4\geq -4 \\ \underline{-4\quad -4} \\ \frac{2x}{2} \geq \frac{-8}{2} \end{array}$$

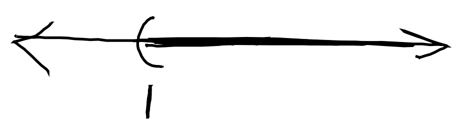
$x\geq -4$



$[-4,1)$

(2) $5x-3>2$

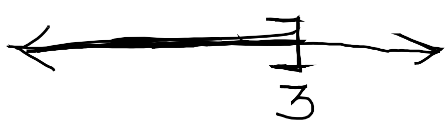
$$\begin{array}{r} 5x-3>2 \\ \underline{+3\quad +3} \\ \frac{5x}{5} > \frac{5}{5} \end{array}$$



$x>1$

OR

$-2x\geq -6$



$\frac{-2x}{-2}\leq \frac{-6}{-2}$

$x\leq 3$

$(-\infty,\infty)$

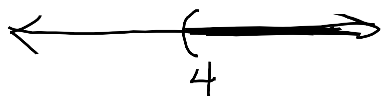
(3) $-2<\frac{x-3}{3}<4$

$3(-2)<\cancel{3}^{1}\frac{(x-3)}{\cancel{3}}<3\cdot 4$

$$\begin{array}{r} -6<x-3<12 \\ \underline{+3\qquad +3\quad +3} \\ -3<x<15 \end{array}$$

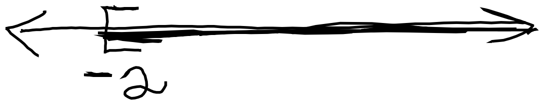
$(-3,15)$

(4) $x > 4$



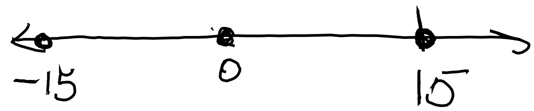
OR $x \geq -2$

solution



$[-2, \infty)$

(5) $|3x+6| - 7 = 8$



$$\begin{array}{rcl} |3x+6| - 7 &=& 8 \\ +7 && +7 \\ \hline |3x+6| &=& 15 \end{array}$$

$$\begin{array}{rcl} 3x+6 &=& 15 \\ -6 && -6 \\ \hline \frac{3x}{3} &=& \frac{9}{3} \end{array} \quad \text{OR} \quad \begin{array}{rcl} 3x+6 &=& -15 \\ -6 && -6 \\ \hline \frac{3x}{3} &=& \frac{-21}{3} \end{array}$$

$x = -7$

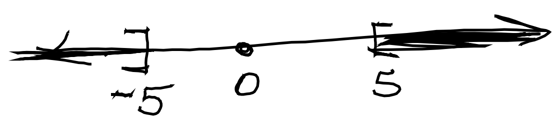
$x = 3$

$\{3, -7\}$

(6) $|4x-7| = -5$ $\qquad |a| \neq$ a negative

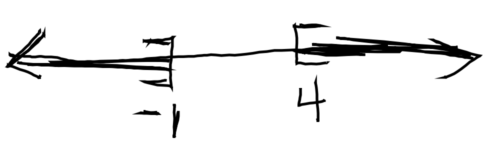
no solution

(7) $|3-2x| \geq 5$



$$\begin{array}{rcl} 3-2x &\leq& -5 \\ -3 && -3 \\ \hline -2x &\leq& -8 \end{array} \qquad \begin{array}{rcl} 3-2x &\geq& 5 \\ -3 && -3 \\ -2x &\geq& 2 \end{array}$$

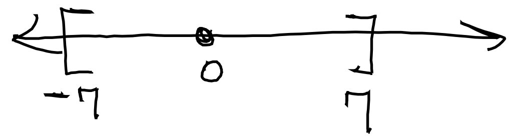
$\frac{-2x}{-2} \geq \frac{-8}{-2}$ $\qquad \frac{-2x}{-2} \leq \frac{2}{-2}$



$x \geq 4$ OR $x \leq -1$

$(-\infty, -1] \cup [4, \infty)$

(8) $\left|\dfrac{2x-1}{3}\right| \le 7$



$$-7 \le \frac{2x-1}{3} \le 7$$

$$3(-7) \le \cancel{3}\left(\frac{2x-1}{\cancel{3}}\right) \le 3\cdot 7$$

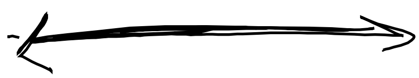
$$\begin{array}{ccccc} -21 & \le & 2x-1 & \le & 21 \\ +1 & & +1 & & +1 \\ \hline \end{array}$$

$$\frac{-20}{2} \le \frac{2x}{2} \le \frac{22}{2} \Rightarrow -10 \le x \le 11$$

$[-10, 11]$

(9) $|4-5x| > -6$

$|a| >$ any neg.



$(-\infty, \infty)$

(10) $|2-3x| = |x+2|$

If $|a| = |b| \Rightarrow \boxed{a = b \text{ or } a = -b}$

$\rightarrow$ $2-3x = x+2$ or $2-3x = -(x+2)$

$$\begin{array}{rcl} 2-3x &=& x+2 \\ -2 & & -2 \\ \hline -3x &=& x \\ +3x & & +3x \\ \hline \dfrac{0}{4} &=& \dfrac{\cancel{4}x}{\cancel{4}} \end{array}$$

$\boxed{0 = x}$

$$\begin{array}{rcl} 2-3x &=& -x-2 \\ -2 & & -2 \\ \hline -3x &=& -x-4 \\ +x & & +x \\ \hline \dfrac{-2x}{-2} &=& \dfrac{-4}{-2} \end{array}$$

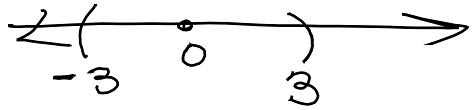
$\boxed{x = 2}$

Solution
$\{0, 2\}$

(11) $|x+3| + 2 < 5$

$\quad\quad\quad\quad -2 \quad -2$

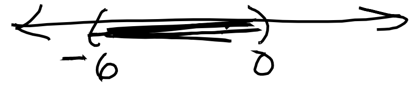
$|x+3| < 3$



$-3 < x+3 < 3$

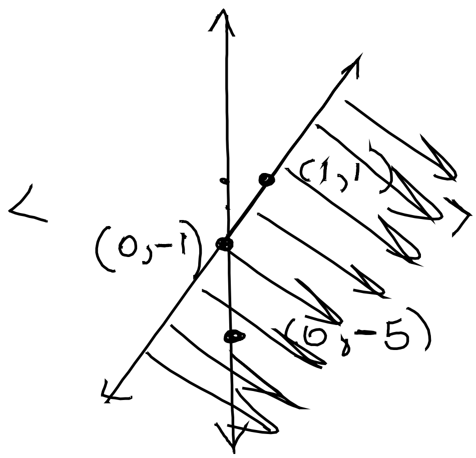
$-3 \quad\quad -3 \quad -3$

$-6 < x < 0$



$(-6, 0)$

(12)



$y \le 2x-1$

$y = 2x-1$

$(0,-1)$ $\quad m = \frac{2}{1}$

$-5 \overset{?}{\le} 2(0)-1$

$-5 \le -1$

(13) $4x-2y<6$

x	y
0	-3
3/2	0

$4x-2y=6$

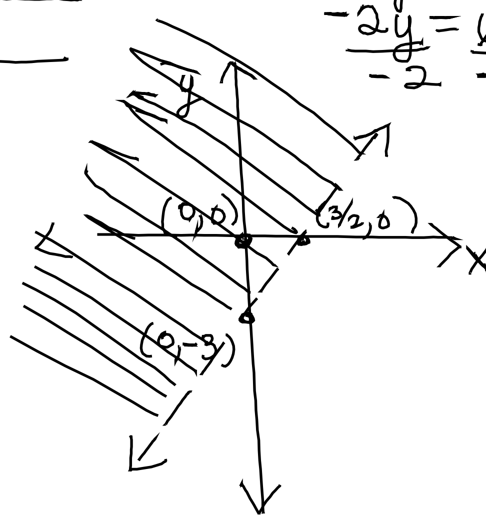
$4(0)-2y=6$

$\frac{-2y}{-2} = \frac{6}{-2}$

$4x-2(0)=6$

$\frac{4x}{4} = \frac{6}{4}$

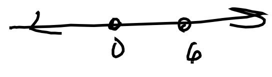
$x = 3/2$



$4x-2y<6$

$4(0)-2(0)<6$

$0<6$



(14) $2x - y \geq -4$

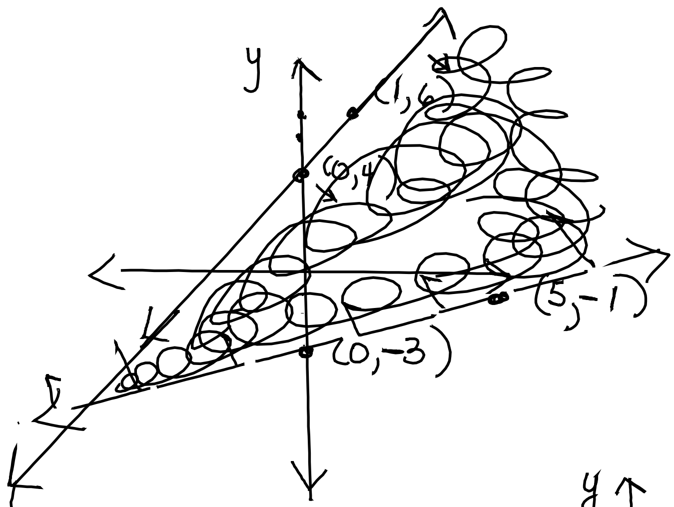
$-2x \qquad -2x$

$-y \geq -2x - 4$

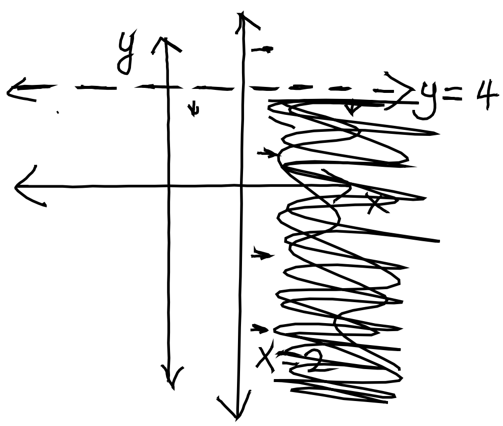
$\frac{-y}{-1} \leq -\frac{2x}{-1} - \frac{4}{-1} \qquad y \leq 2x + 4$

$y > \frac{2}{5}x - 3$

$y = \frac{2}{5}x - 3$



(15) $y < 4$



$x \geq 2$

(16) $\sqrt[3]{64x^9y^6} = \sqrt[3]{4^3 (x^3)^3 (y^2)^3} = 4x^3y^2$

(17) $-\sqrt{49x^3y^{16}} = -\sqrt{7^2 x^2 x^1 (y^8)^2}$

$= 7xy^8\sqrt{x}$

(19) $\sqrt[5]{(x-2)^5}$ $\sqrt[n]{x^n} = x$

$x-2$

(20) $\sqrt[3]{\dfrac{54x^{13}y^5}{2x^4y^2}} = \underbrace{\sqrt[3]{\boxed{27x^9y^3}}} = \sqrt[3]{(3)^3(x^3)^3(y^1)^3}$

$= 3x^3y^1$

(21) $\left(\dfrac{x^{2/3}}{y^{-1/3}}\right)^6 = \dfrac{(x^{2/3})^6}{(y^{-1/3})^6} = \dfrac{x^4}{y^{-2}} = x^4y^2$

$\dfrac{1}{a^{-n}} = a^n$

(22) $\left(\dfrac{x^{1/2}}{y}\right)^{-2} = \dfrac{(x^{1/2})^{-2}}{(y^1)^{-2}} = \dfrac{x^{-1}}{y^{-2}} = \dfrac{y^2}{x}$

(23) $a^{2/3}\left(a^{1/3} - 2a^{4/3}\right)$

$\underline{a^{2/3}}\,\underline{a^{1/3}} - 2a^{2/3}a^{4/3}$

$a^1 - 2a^2 = a - 2a^2$

(24) $\sqrt[3]{25x^2y^4} \cdot \sqrt[3]{5x^7y^8}$

$= \sqrt[3]{25 \cdot 5\, x^2x^7\, y^4y^8}$

$\sqrt[3]{125x^9y^{12}}$

$\sqrt[3]{(5)^3(x^3)^3(y^4)^3}$

Practice Test 2

$$\sqrt[3]{(5)^3 (x^3)^3 (y^4)^3} = 5x^3y^4$$

(25) $$\frac{6\sqrt{a^5 b}}{\sqrt{4a^2b^3}} = \frac{6}{1}\sqrt{\frac{a^5 b^1}{4a^2b^3}} = \frac{6}{1}\sqrt{\frac{a^3 b^{-2}}{4}}$$

$$= \frac{6}{1}\sqrt{\frac{a^2 \cdot a^1}{4b^2}} = \frac{\overset{3}{\cancel{6}}\, a\sqrt{a}}{1 \cdot \cancel{2} \cdot b} = \frac{3a\sqrt{a}}{b}$$

(26) $$3\sqrt{32x^2} + 5x\sqrt{8}$$

$$3\sqrt{\underline{16}\cdot 2 \cdot x^2} + 5x\sqrt{4\cdot 2}$$

$$3\cdot 4\cdot x\sqrt{2} + 5\cdot x\cdot 2\sqrt{2}$$

$$\underline{12x\sqrt{2}} + \underline{10x\sqrt{2}} = 22x\sqrt{2}$$

(27) $$(2-3\sqrt{3})(2+3\sqrt{3}) = 4-(3\sqrt{3})^2$$

$$(a-b)(a+b) = a^2-b^2 \qquad 4-9\cdot 3$$

$$4-27 = -23$$

(28) $$(\sqrt{7}+\sqrt{2})(\sqrt{7}+\sqrt{2})$$

$$\sqrt{49}+\sqrt{14}+\sqrt{14}+\sqrt{4} = 7+2\sqrt{14}+2$$

$$9+2\sqrt{14}$$

29 $\sqrt[3]{54x^4} + 4x\sqrt[3]{16x}$

$\sqrt[3]{27 \cdot 2 \cdot x^3 \cdot x^1} + 4 \cdot x\sqrt[3]{8 \cdot 2x}$

$3x\sqrt[3]{2x} + 4 \cdot x \cdot 2\sqrt[3]{2x}$

$3x\sqrt[3]{2x} + 8x\sqrt[3]{2x} = 11x\sqrt[3]{2x}$

30 $\sqrt{45} - \sqrt{20}$

$\sqrt{9 \cdot 5} - \sqrt{4 \cdot 5}$

$3\sqrt{5} - 2\sqrt{5} = \sqrt{5}$

31 $(4\sqrt{3} - 3\sqrt{2})(5\sqrt{3} + 3\sqrt{2})$

F

$20\sqrt{9} + 12\sqrt{6} - 15\sqrt{6} - 9\sqrt{4}$

$60 - 3\sqrt{6} - 18 = \boxed{42 - 3\sqrt{6}}$

32 $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$P_1(-5, 8) \quad P_2(1, 16)$

$d = \sqrt{(1-(-5))^2 + (16-8)^2} = \sqrt{36 + 64}$

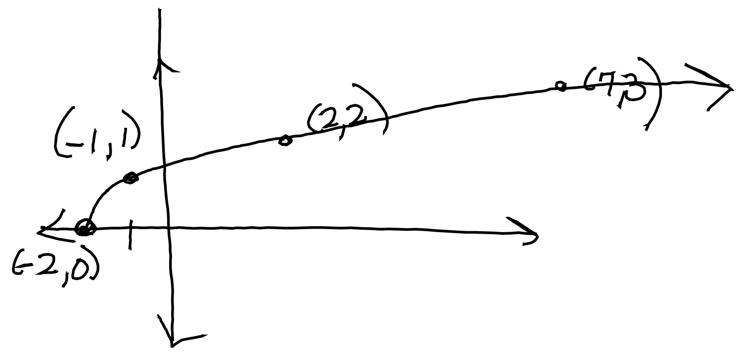
$= \sqrt{100} = 10$ units

(33) $\sqrt{x+2}$

$$\begin{aligned} x+2 &\geq 0 \\ -2 \quad & -2 \\ \hline x &\geq -2 \end{aligned}$$

D: $[2, \infty)$

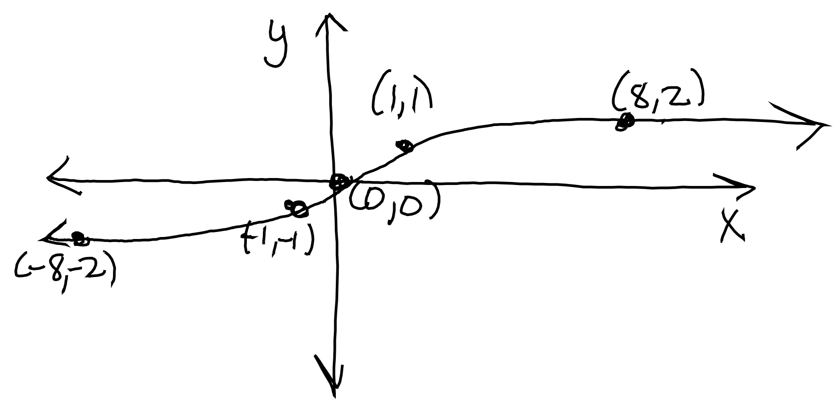
x	$\sqrt{x+2}$	y
-2	$\sqrt{-2+2}$	0
-1	$\sqrt{-1+2}$	1
2	$\sqrt{2+2}$	2
7	$\sqrt{7+2}$	3



Range: $[0, \infty)$

(34) $g(x) = \sqrt[3]{x}$ Domain $(-\infty, \infty)$

x	$y = \sqrt[3]{x}$
-8	-2
-1	-1
0	0
1	1
8	2



Range $(-\infty, \infty)$